School Height and Weight Report

South Dakota Students
2007-2008 School Year

South Dakota Department of Health
December 2008

PREFACE

School Height and Weight Report, South Dakota Students, 2007-2008 School Year was prepared by the South Dakota Department of Health.

This report is divided into 18 sections which contain data on childhood obesity as well as guidelines and references for preventing and reversing the childhood obesity epidemic. Sections of note are: Executive Summary, which highlights data at a glance; Technical Notes, which explains the terminology and BMI for children and adolescents; and Regional Data, which examines the data by the Department of Education's regions.

Also included are instructions and a form for any school interested in submitting data in the future.

Any questions concerning the data may be directed to the following office within the South Dakota Department of Health:

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Executive Summary

This report summarizes data collected on school-age children and adolescents during the 2007-2008 school year and also includes data collected since the start of the project in the 1998-1999 school year.

Key Findings:

- This is the tenth year data has been collected.
- Sample size is currently 26.9 percent of the state's students.
- School submissions in the current report represent 249 schools.
- No age group has been over the expected 5 percent below the 5th percentile in BMI-for-age or underweight.
- There has been a slight increase in the "overweight" category from 16.6 percent in 2006-2007 to 16.8 percent in 2007-2008.
- By race, American Indians increased in the "overweight" category from 20.0 percent in 2006-2007 to 20.6 percent in 2007-2008.
- Overall, there has been a decrease in the "obese" category from 16.9 percent in 2005-2006 to 16.3 percent in 2007-2008 but an increase from 15.1 percent in 1998-1999.
- By race, American Indians decreased in the "obese" category from 26.8 percent in 2006-2007 to 25.9 percent in 2007-2008.
- South Dakota has not met the *Healthy People 2010 Objective* of 5 percent overweight and obese in children and adolescents.

2007-2008 South Dakota data at a glance (ages 5-19):

- 3.9 percent Height-For-Age below 5th percentile. (Short stature)
- 2.8 percent of children fall below the 5th percentile in BMI-for-age. (Underweight).
- 16.8 percent "overweight".
- 16.3 percent "obese".
- American Indians – 20.6 percent "overweight".
- American Indians – 25.9 percent "obese".

Results

Although South Dakota uses slightly different age group categories for analysis, the South Dakota data is currently lower than the latest national data.

These data were compared to the growth charts developed by the Centers for Disease Control and Prevention. The growth charts are based on the body mass index* (BMI) and provide the most up-to-date standard for evaluating body measurements of children. The growth charts provide a reference that is consistent with adult standards so they can be used continuously from two years of age to adulthood.

It should be noted even though BMI is an effective screening tool used to identify individuals who are underweight or overweight, it is not a diagnostic tool. For example, a child who is relatively heavy may have a high BMI for his or her age. To determine whether the child has excess fat or is truly obese, further assessment is needed which may include triceps skinfold measurements, assessments of diet, health, and physical activity.

* Body Mass Index is calculated by dividing a person's weight in pounds by their height in inches squared times 703. The mathematical equation for BMI is: weight (lb)/height (in)^2 x 703.

Introduction

Due to increasing rates of child obesity and its health risks, the Department of Health (DOH), in cooperation with the South Dakota Department of Education (DOE), started a process during the 1998-1999 school year to collect data on the height and weight of students. The intent of this data collection effort was to start a data surveillance system of school-aged children.

This report summarizes the data collected during the 2007-2008 school year and allows South Dakota to quantify the extent of the childhood obesity problem. In addition, it provides the DOH and DOE the data needed to address the prevention of childhood obesity and decrease it as a public health problem.

Data Collection Process

Letters requesting schools share the height and weight data with the DOH were sent by the Coordinated School Health Program to all South Dakota school health and physical education teachers, and school nurses. Copies of this letter were also sent electronically to superintendents and building principals. Data collection instructions on how to measure children and how to submit data were posted on the project website, http://doh.sd.gov/SchoolWeight/. Electronic submission using the Infinite Campus system is preferred but other formats (Appendix 1) were accepted and included in the results. Participation in the data collection effort was voluntary and no remuneration was provided.

This project was completed for the tenth time during the 2007-2008 school year.

Comparison to Previous School Year Reports

The School Height and Weight Report, For South Dakota Students, 1998-1999 School Year is not comparable to any report published after it. The 1998-1999 publication reported weight-for-height above the 95th percentile for younger students and Body Mass Index or BMI above the 95th percentile for adolescents between 15 percent and 18 percent. For male students, the reference was through the age of 11 years 6 months and less than 57 inches tall. For females, the reference was through the age of 10 years and less than 54 inches tall. The available BMI standard could be used for students 14 to 18 years of age.

Starting with the report for the 1999-2000 school year, the DOH used BMI-for-age as the criteria.

Starting with the 2006-2007 report the definition for category for the 95th percentile and above was changed from “overweight” to “obese” and the category for the 85th percentile through 94th percentile has been changed from “at risk of overweight” to “overweight” to reflect the new recommendations for definitions for children and adolescents.

However, the Centers for Disease Control and Prevention (CDC) reanalyzed all data along with this year’s data to the same standards and definitions and comparisons will be included in this report where possible.

Data Limitations

Data quality has been determined to be within acceptable standard deviation but has the following limitations:

First, schools voluntarily submitted height and weight data from across the state but no attempt was made to obtain a representative sample (Appendix 2 and 3). However, data was collected for 26.9 percent of the state's students from 249 schools, which is 28.4 percent of the state's attendance centers. While American Indian students comprise 15.7 percent of the South Dakota enrollment population, they represent 11.4 percent of the survey respondents.

Second, the Department of Health and the CDC filtered the data and the following types of records were removed: data gathered prior to the 2007-2008 school year, data that had biologically implausible results, entries where all essential data elements were not completed and duplicate records. After the above cases were removed, the sample size was 37,028 students and 249 schools for analysis.

Third, while the instructions included the type of equipment and technique that should be used, there is no assurance that these instructions were always followed. South Dakota DOH has been providing balance-beam scales and wall-mounted measuring boards to schools to help improve the quality of data. While it is not known what training persons who obtained the measurement had, it is known that much of the data was obtained by, or under the supervision of, school nurses or school health and physical education teachers.

Fourth, South Dakota's height data are of acceptable quality, however, worldwide measurements of height tend to be of marginal quality. There could be several possible reasons for this including use of measuring equipment that did not allow accurate heights to be obtained. This can occur when the person doing the measuring is shorter than the person being measured. Measurers of adolescents may need to stand on a stool or a bench to have eye level be above the child's head. Also if the measuring stick on a standing scale was used, the children would be inaccurately reported as shorter than they are. South Dakota should be cognizant of this problem when determining heights. This may be solved now as adolescent height is more "normal" but this may explain the high level of short stature for the 1998-1999 school year.

Measurement Requirements

Schools and/or school districts who submitted measurements from 100 or more students are receiving school specific and/or district specific data along with the aggregate data in this report. The requirement total of 100 measurements may occur over a period of three years. Measurements from schools who submitted data from less than 100 students will only be provided with the aggregate data in this report. CDC determined that small numbers do not produce stable rates and established the 100-student cut-off.

Height

Short stature is defined as a height-for-age below the 5th percentile for children of the same height and age in the reference populations used by the CDC. Short stature may be evidence of compromised health, delayed development, and poor diet.

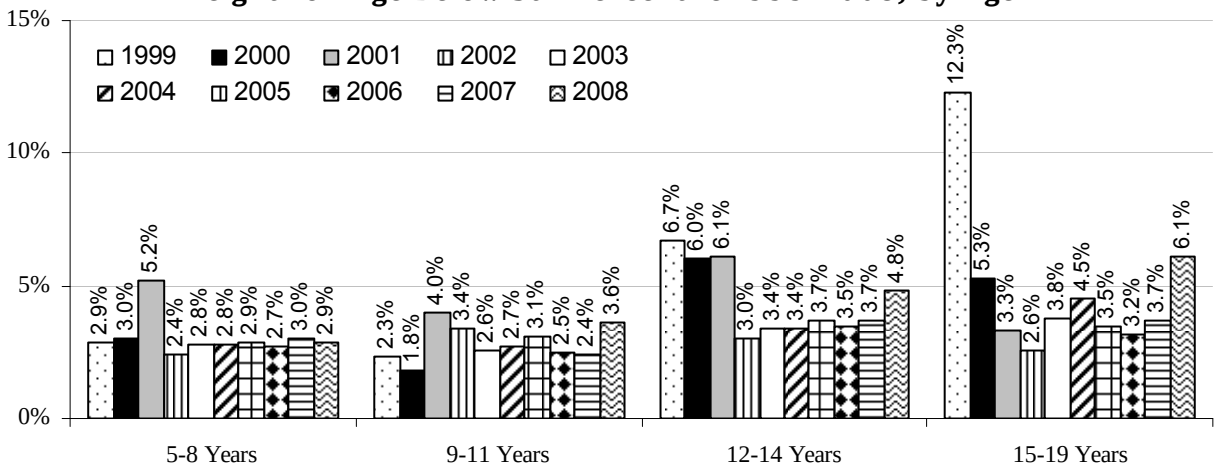
Table 1, below, contains the height-for-age data for South Dakota students. The data for South Dakota children ages 5 to 8 indicate that 2.9 percent are below the 5th percentile. The data also indicate that 3.6 percent of children ages 9 to 11, 4.8 percent of students ages 12 to 14, and 6.1 percent of students ages 15 to 19 are below the 5th percentile. Lastly, the data for total students indicate that 3.9 percent are below the 5th percentile. Gender wise, female students are at 4.0 percent and males are 3.8 percent. There are 10 schools in 2007-2008 school year with results above 5 percent. Years 1999 to 2008 of height-for-age are illustrated in Figure 1.

Table 1: School Year 2007-2008
Height-for-Age

Age	Number Of Students	Height-For-Age Below 5th Percentile
5-8 years	12,293	2.9%
9-11 years	11,029	3.6%
12-14 years	9,677	4.8%
15-19 years	3,389	6.1%
Total	37,028	3.9%

Source: South Dakota Department of Health
Note: Due to changes in the CDC/WHO age and height references these data can not be compared to reports of School Height and Weight for South Dakota Students published before the 2000-2001 school year.

Figure 1
Height-for-Age Below 5th Percentile 1999-2008, by Age



Note: Year represents the end of school year, i.e. 2008 is for school year 2007-2008, etc.
1999 rates – refer to page 2 about comparisons.
Source: South Dakota Department of Health

Table 2 provides the percent of height-for-age by race for students. When the data are analyzed by race, South Dakota again has less than the expected 5 percent below the 5th percentile in each race category.

Table 2: School Year 2007-2008 Height-For-Age, by Race		
Race	Number of Students	Height-for-Age Below 5th Percentile
White	29,040	4.2%
American Indian	4,169	1.7%
Other Races	1,997	4.9%
Race Unknown/Not Specified	1,822	3.6%
Total	37,028	3.9%

Source: South Dakota Department of Health
Note: Due to changes in the CDC/WHO age and height references these data can not be compared to data in previous reports prior to the School Height and Weight for South Dakota Students 2000-2001 School Year.

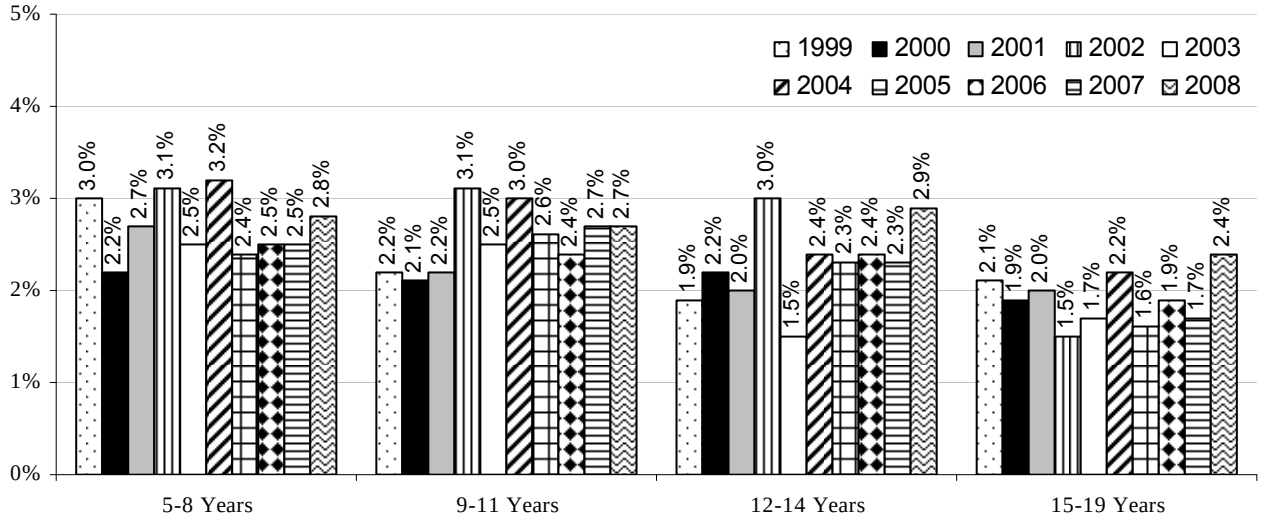
Underweight

Children falling below the 5th percentile in BMI-for-age, compared to children of the same gender and age in the CDC reference population, are considered underweight. The conditions contributing to a low BMI are inadequate dietary intake, failure to thrive, chronic and infectious diseases, and variations within a population. Table 3, below, indicates that South Dakota (statewide) has less than the expected 5 percent below the 5th percentile of school children from all age groups and as a population are not considered to be underweight when compared to their peers nationally. This is true for all the years of data collected to date, as illustrated in Figure 2, next page. This is also true when the data is looked at by gender; female students are at 2.6 percent and male students at 2.9 percent, which is below the expected 5 percent.

Table 3: School Year 2007-2008 Underweight Low Body Mass Index for Age		
Age	Number of Students	Body Mass Index Below 5th Percentile
5-8 years	12,933	2.8%
9-11 years	11,029	2.7%
12-14 years	9,677	2.9%
15-19 years	3,389	2.4%
Total	37,028	2.8%

Source: South Dakota Department of Health
Note: Due to changes in the CDC/WHO age and height references, these data cannot be compared to data in previous reports prior to the School Height and Weight for South Dakota Students 2000-2001 School Year.

Figure 2
Underweight Weight-for-Height 1999-2008, by Age



Note: Year represents the end of school year, i.e. 2008 is for school year 2007-2008, etc
1999 rates – refer to page 2 about comparisons.
Source: South Dakota Department of Health

Table 4 provides the percent of underweight students by race. When the data are analyzed by race, South Dakota again has less than the expected 5 percent below the 5th percentile in each race category. However, there are 13 schools in 2007-2008 school year with results above 5 percent.

Table 4: School Year 2007-2008
Underweight
Low Body Mass Index, by Race

Race	Number of Students	Body Mass Index Below 5th Percentile
White	29,040	2.9%
American Indian	4,169	2.1%
Other Races	1,997	3.1%
Race Unknown/Not Specified	1,822	2.3%
Total	37,028	2.8%

Source: South Dakota Department of Health
Note: Due to changes in the CDC/WHO age and height references these data can not be compared to data in previous reports prior to the School Height and Weight for South Dakota Students 2000-2001 School Year.

Overweight and Obese

With last year's 2006-2007 report, DOH began using the new definitions of overweight and obese to describe elevated BMI-for-age for children and adolescents. BMI-for-age is the preferred term to describe children and adolescents. For adults, just a BMI value is used, but as children grow at different rates depending upon age and gender, the BMI value is plotted on growth charts and the resulting value of BMI-for-age is presented as a percentile value.

The American Medical Association, in collaboration with the U.S. Department of Health and Human Services Administration and the Centers for Disease Control and Prevention, convened an expert committee to develop recommendations on the assessment, prevention, and treatment of child and youth overweight and obesity. This expert panel representing 15 professional organizations recommended changing the terms used to describe pediatric obesity. If a child's BMI-for-age is between the 85th and 94th percentile in the CDC reference population of children matched for age and gender, the new term to describe the child is "overweight". The previous term used was "at risk for overweight". If a child is at or above the 95th percentile for children of that age and gender, the child is considered to be "obese" rather than the previous term "overweight." The new terms overweight and obese provide continuity to adult definitions of overweight and obese and avoid confusion with the term "at risk of overweight." Because the recommended cutoff points have not changed, these definition changes will not affect the prevalence rates of the BMI categories.

One of the national Healthy People 2010 objectives is to "reduce the proportion of children and adolescents who are overweight or obese." This is defined as, "at or above the gender- and age-specific 95th percentile of BMI based on a preliminary analysis of data used to construct the year 2001 U.S. Growth Charts." The term "obese" is used throughout this report to indicate children and adolescents who meet the criteria for the Healthy People 2010 objective. The target in each of four age groups is 5 percent.

DOH also has as a goal to "reverse the trend and reduce the percent of school-age children and adolescents who are at or above the 95th percentile BMI for age (obese) from 17 percent in 2003 to 15 percent by 2010."

The prevalence of obesity has dramatically risen among children in the United States, particularly among minority populations. There are multiple causes of childhood obesity, most of which are associated with poor nutritional habits and inactivity. Obesity and overweight have been found to be difficult and expensive to treat and cure, therefore preventing this condition in children will be the key to addressing this national epidemic. So far, however, there are few examples of effective obesity prevention programs especially among high risk isolated, rural populations.

Table 5 (next page) provides the BMI-for-age statistics for South Dakota students. These data show that for all of the age groups, South Dakota will need to substantially reduce the number of obese children and adolescents in order to meet the Healthy People 2010 objective of 5 percent.

Table 5: School Year 2007-2008 Overweight and Obese Body Mass Index for Age				
Age	Number of Students	Overweight	Obese	Overweight and Obese Combined
5-8 years	12,933	16.6%	14.4%	31.0%
9-11 years	11,029	17.1%	17.7%	34.8%
12-14 years	9,677	16.9%	16.8%	33.7%
15-19 years	3,389	16.1%	17.4%	33.5%
Total	37,028	16.8%	16.3%	33.1%

Source: South Dakota Department of Health
Note: Due to changes in the CDC/WHO age and height references, these data can not be compared to data in previous reports prior to the School Height and Weight for South Dakota Students 2000-2001 School Year.

Figures 3 through 6 (below), illustrate each age group's obese rate by year, compared to that year's rate of all students at the 95th percentile and above. When compared to statewide rates, students ages 9 to 14 are consistently higher than the group as a whole each year, while 5 to 8 year olds are repeatedly lower. Students ages 15 to 19 years old exhibit the most change compared to statewide rates with some years being higher and some lower.

Figure 3: Obese 5-8 Year Olds Compared to State Totals, 1999-2008

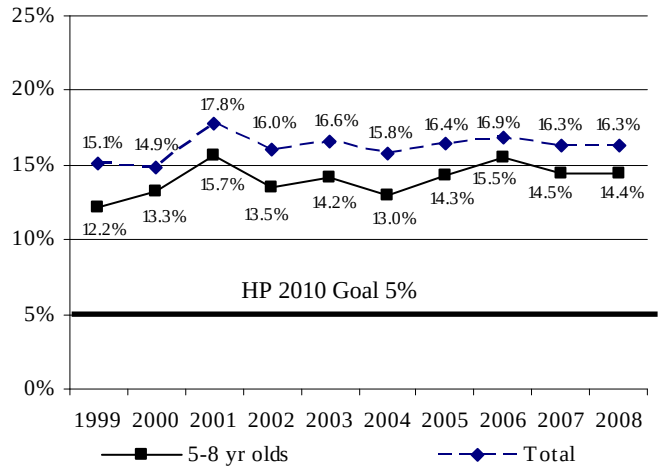


Figure 4: Obese 9-11 Year Olds Compared to State Totals, 1999-2008

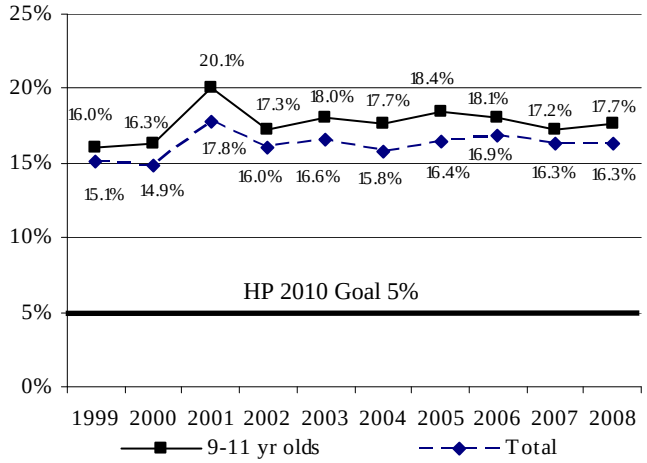


Figure 5: Obese 12-14 Year Olds Compared to State Totals, 1999-2008

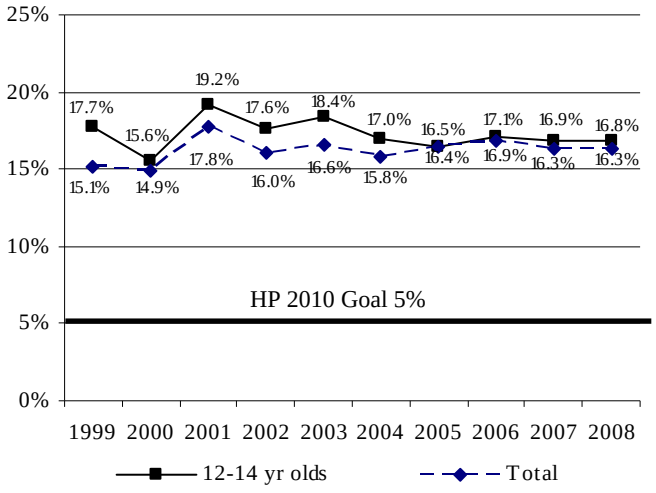
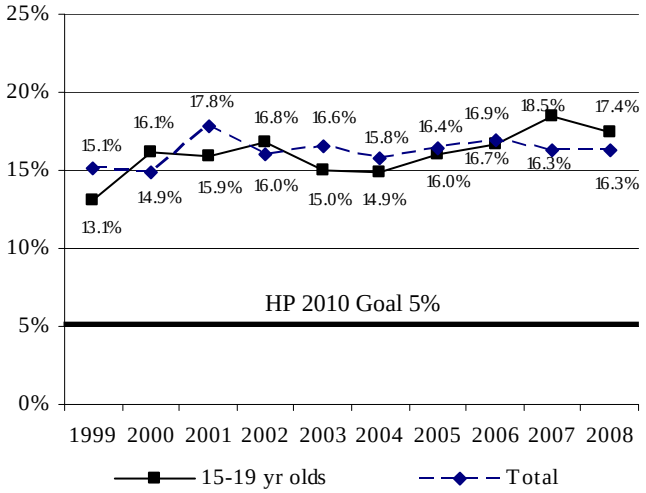


Figure 6: Obese 15-19 Year Olds Compared to State Totals, 1999-2008



Figures 3-6 Source: South Dakota Department of Health
Note: Year represents the end of school year, i.e. 2008 is for school year 2007-2008, etc.
1999 rates, refer to page 2 about comparisons

When the body mass index data were analyzed by race in Table 6, 16.1 percent of whites and 20.6 percent of American Indians were between the 85th percentile and 94th percentiles or were overweight. In addition, these data indicate that 14.8 percent of whites and 25.9 percent of American Indians were above the 95th percentile or obese. This is an increase for white students and a decrease for American Indian students when compared to the 2006-2007 school year.

Table 6: School Year 2007-2008
Overweight and Obese
Body Mass Index, by Race

Race	Number of Students	Overweight	Obese	Overweight and Obese Combined
White	29,040	16.1%	14.8%	30.8%
American Indian	4,169	20.6%	25.9%	46.5%
Other Races	1,997	19.0%	17.9%	36.9%
Race Unknown/Not Specified	1,822	15.8%	14.2%	30.0%
Total	37,028	16.8%	16.3%	33.1%

Source: South Dakota Department of Health
Note: Due to changes in the CDC/WHO age and height references, these data cannot be compared to data in previous reports prior to the School Height and Weight for South Dakota Students 2000-2001 School Year.

Table 7 contains the number of student measurements taken from 1999 to 2008 with the percent "overweight" and "obese". The data is also displayed by gender.

As the table illustrates, females have consistently had higher "overweight" percentage than the males, while the males have had higher "obese" percentage than the females.

Table 7: School Year 1999-2008 Overweight and Obese
Body Mass Index, by Gender

	Total			Female			Male		
Year	# of Students	Overweight	Obese	# of Students	Overweight	Obese	# of Students	Overweight	Obese
2008	37,028	16.8%	16.3%	17,931	17.2%	14.5%	19,097	16.4%	17.9%
2007	41,579	16.6%	16.3%	20,359	16.9%	14.7%	21,220	16.3%	17.8%
2006	45,251	16.9%	16.9%	21,948	17.3%	15.3%	23,303	16.5%	18.3%
2005	35,489	16.6%	16.4%	17,295	16.7%	14.8%	18,194	16.6%	17.8%
2004	27,418	16.2%	15.8%	13,278	16.1%	14.3%	14,140	16.3%	17.2%
2003	19,424	16.7%	16.6%	9,518	17.0%	15.1%	9,906	16.4%	18.0%
2002	15,559	16.5%	16.0%	7,522	16.5%	14.5%	8,037	16.5%	17.3%
2001	12,285	15.9%	17.8%	6,002	16.1%	16.2%	6,283	15.6%	19.3%
2000	14,655	16.9%	14.9%	7,215	16.9%	13.9%	7,440	17.0%	15.9%
1999	16,021	16.7%	15.1%	8,015	16.0%	13.2%	8,006	17.3%	16.9%

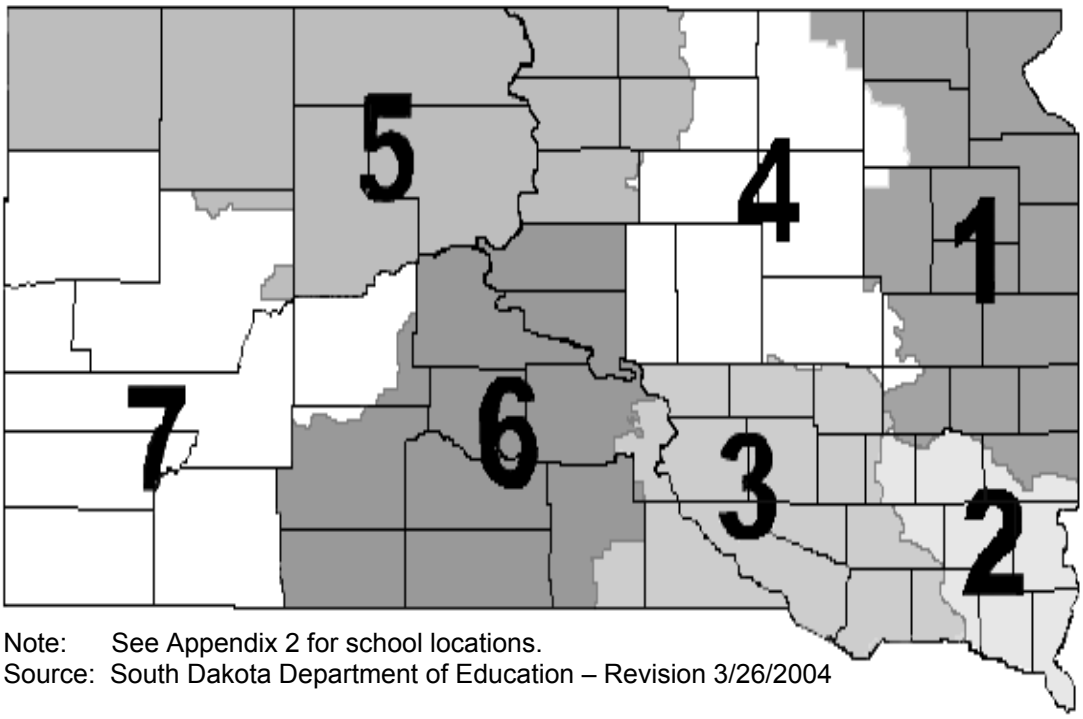
Source: South Dakota Department of Health
Note: Year represents the end of school year, i.e. 2008 is for school year 2007-2008, etc.

Regional Data

The data for 2007-2008 was once again analyzed by education service agency regions. These educational regions reflect public, private and tribal schools located in the geographic areas. Below is a map showing the regions. Table 8 shows the racial distributions and Table 9 shows the demographics of those regions.

Table 10 (next page) shows that region 5 has an obese percent of 21.2. Table 8 below shows that 56.2 percent of the participants in region 5 are American Indians. Of the 4,291 American Indian students included in the total submission, 17 percent were submitted from Region 5.

Figure 7: South Dakota Education Service Agencies Region Map



Note: See Appendix 2 for school locations.
Source: South Dakota Department of Education – Revision 3/26/2004

Table 8: School Year 2007-2008 Racial Distribution by Regions

Region	White	American Indian	Other Race	Unknown / Not Specified
1	89.4%	6.6%	3.8%	0.1%
2	78.2%	2.9%	9.6%	9.3%
3	79.7%	10.0%	3.0%	7.4%
4	90.1%	4.2%	5.6%	0.0%
5	43.3%	56.2%	0.5%	0.0%
6	61.9%	34.6%	3.3%	0.2%
7	67.2%	20.6%	4.0%	8.1%
Total	**78.3%**	**11.4%**	**5.4%**	**4.9%**

Source: South Dakota Department of Health

Table 9: School Year 2007-2008 Age Distribution by Regions

Region	5-8 Years	9-11 Years	12-14 Years	15-19 Years
1	31.5%	29.0%	28.5%	10.9%
2	32.8%	31.2%	30.0%	6.0%
3	37.6%	33.0%	23.6%	5.7%
4	36.1%	24.9%	25.3%	13.8%
5	48.3%	20.7%	15.3%	15.8%
6	46.7%	41.5%	8.4%	3.3%
7	33.4%	29.7%	26.9%	10.1%
Total	**35.0%**	**29.8%**	**26.1%**	**9.1%**

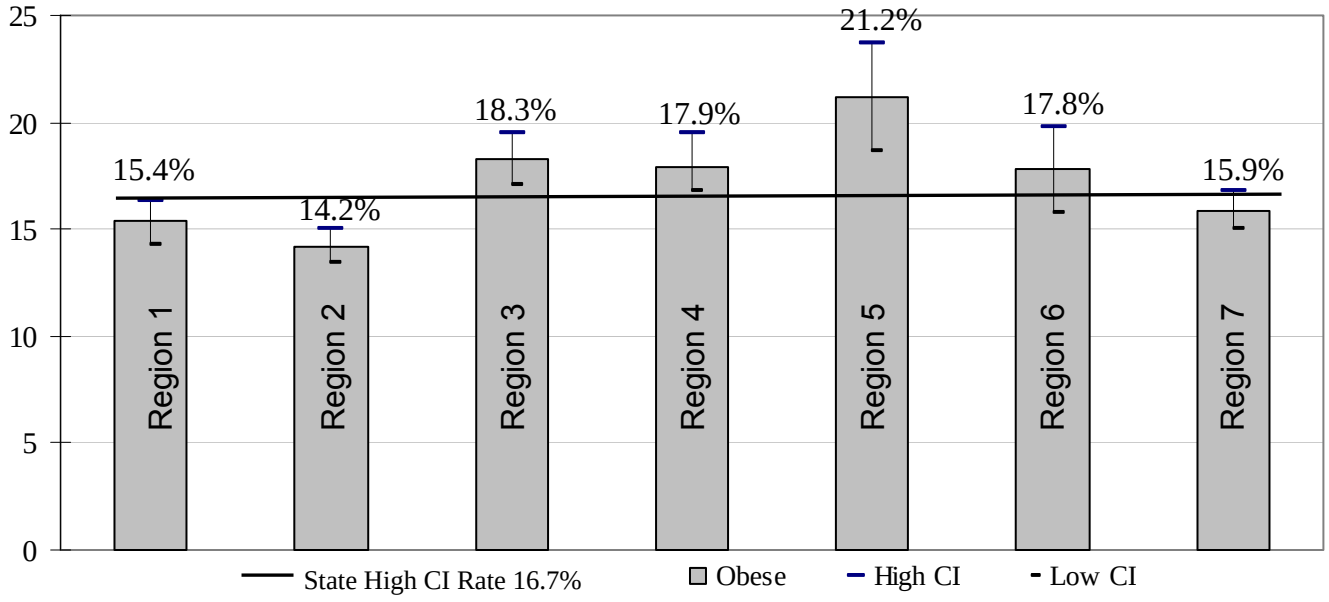
Source: South Dakota Department of Health

Table 10: School Year 2007-2008 Overweight and Obese Body Mass Index, by Regions				
Region	Number of Students	Overweight	Obese	Overweight And Obese Combined
1	6,680	16.1%	15.4%	31.5%
2	9,617	16.5%	14.2%	30.7%
3	4,590	17.1%	18.3%	35.4%
4	6,040	17.5%	17.9%	35.4%
5	1,313	20.0%	21.2%	41.2%
6	1,676	18.5%	17.8%	36.3%
7	7,112	16.1%	15.9%	32.0%
Total	37,028	16.8%	16.3%	33.1%

Source: South Dakota Department of Health

Figure 8 illustrates that Region 2, the southeastern corner of the state, is the only region which is significantly below the state high confidence interval rate of 16.7 percent. Regions 3, 4 and 5 are significantly higher than the state rate. Regions 1, 6 and 7 are not significantly different as they fall into the statewide range of 15.9 to 16.7 percent. See page 19 for an explanation of confidence interval rates.

Figure 8: School Year 2007-2008 Obese Body Mass Index for Age, by Regions with Confidence Intervals



Source: South Dakota Department of Health

Obesity Risk Factors

Obesity is a risk factor for the following conditions in adulthood: cardiovascular disease, hypertension, diabetes, degenerative joint disease, and psychological problems. Although commonly thought of as an adult disease, obesity is a growing problem in children and adolescents and its consequences are increasingly being seen. Numerous studies show pediatric obesity is associated with the increased risks of psychological and psychiatric problems, cardiovascular risk factors, chronic inflammation, type 2 diabetes mellitus and asthma. (Krebs, Pediatrics 120 Suppl, December 2007) Research shows that 60 percent of overweight 5- to 10-year-old children already have at least one risk factor for heart disease, including hyperlipidemia and elevated blood pressure or insulin levels. Type 2 diabetes, a disease that typically appears in adults, is increasing at alarming rates among children and adolescents. Liver disorders are more frequently found in overweight children and overweight children also have more hypertension, sleep apnea, and orthopedic complications. Overweight children are taller and mature earlier than non-overweight children. (Dietz, *Pediatrics 101 Suppl,* March 1998).

The most widespread consequences of obesity in children are psychological. With a culture that generally prefers thinness, obese children are targets of early and systematic discrimination. They have fewer friends and are regarded as lazy or sloppy. Obese adolescents develop a negative self-image. Children who mature early tend to have lower self-esteem. (Dietz, *Pediatrics 101 Suppl,* March 1998).

Having excess weight during childhood increases the chance that the person will be obese as an adult. Whitaker et al (NEJM: 1997;337-869-873) reported that 69 percent of obese children 6 to 10 years will be obese at age 25, 83 percent of obese children 10-15 years will be obese at age 25, and 77 percent of obese adolescents 15-18 years will be obese at age 25. For children overweight, the percentages are 55, 75, and 67 respectively. Overweight and obesity in childhood and adolescence have also been associated with adverse socioeconomic outcomes in adulthood.

Comparison to Other Data

Height and weight data were measured nationally in a series of representative surveys (National Health Examination Survey-NHES and National Health and Nutrition Examination Survey-NHANES). When the new obese definition is applied to data from earlier national health examination surveys, it is apparent that obesity in children and adolescents was relatively stable from the 1960s to 1980. However, from NHANES II (1976-80) to NHANES III, the prevalence of obesity nearly doubled among children and adolescents. In the time interval between NHANES II and III, the prevalence of obesity among children ages 6-11 years increased from an estimated 7 percent to 11 percent, and among adolescents ages 12-19 years, increased from 5 percent to 11 percent. NHANES IV results for 2003-2004 indicate that 18.8 percent of children, ages 6 to 11 were obese and 17.4 percent of adolescents ages 12 to 19 were obese.

Results from the 1999-2004 National Health and Nutrition Examination Survey (NHANES) suggest that the increasing percentage of obese children is a public health challenge. In 1976-1980, only 6 percent of children ages 6-17 were obese. By 1988-1994, this proportion had risen to 11 percent, and continued to rise to 15 percent in 1999-2000.

In 2001-2002, 17 percent of children were obese and in 2003-2004, this proportion was 18 percent. The findings suggest the likelihood of another generation of children and adolescents becoming obese adults who may be at risk for obesity related health conditions. Another recent NHANES survey found that obesity prevalence among children and adolescents showed no significant changes between 2003-2004 and 2 005-2006. Based on the study, in the combined years of 2003-2006, 16.3% of children and adolescents aged 2-19 years were obese, at or above the 95th percentile of the 2000 BMI-for-age growth charts.

By using the Pediatric Nutrition Surveillance System or PedNSS, the South Dakota Department of Health has collected height and weight data of infants and children participating in the South Dakota Supplemental Nutrition Program for Women, Infants, and Children (WIC) since 1995. WIC serves children under the age of 5 who are at nutritional risk and are from families with limited incomes. The 2007 rate for those at or above the 95th percent for BMI-for-age, ages 2 to 5 years was 15.2 percent, up from 14.3 percent in 2006.

Prevention of Child Overweight and Child Obesity

Child overweight and child obesity is a multi-faceted problem that should be addressed by promoting healthy eating and increasing physical activity and decreasing inactivity. While it will take all South Dakotans working together to overcome this increasing problem, schools can play a key role in providing education and healthy environments.

Care must also be taken not to encourage weight preoccupation, inappropriate eating habits, and extreme amounts of exercise associated with eating disorders in youth. While overweight and obese are used in this report, choosing language to inform the child and family should be more neutral, such as using “weight” , “excess weight”, and “BMI.”

Based on the school height and weight data submitted, some South Dakota schools have successfully worked to reverse the increasing trend in overweight children. For ideas about what these schools are doing, see Success Stories under the schools tab on www.healthysd.gov. School Wellness Policies can be a great vehicle for creating healthier environments. For assistance with developing wellness policies go http://doe.sd.gov/oess/cans/docs/Wellness_Policy.pdf.

While prevention should be the goal, it is recognized that individual children may need specific plans of care. Schools are encouraged to work with their local health care providers to define when and how referrals for further evaluation and intervention are made for individual students.

What Everyone Can Do

- Set a good example by being physically active and eating a healthy, balanced intake high in fruits, vegetables, and whole grains.
- Advocate for convenient, safe, and adequate places for young people to play and take part in physical activity programs.
- Support daily physical education and other school programs that promote lifelong healthy eating and physical activity, not just competitive sports.
- Urge parent associations and school clubs to sell healthy foods or nonfood items for fund-raising activities.
- Join a school health or nutrition advisory council, such as Team Nutrition, to help guide nutrition policy and educational programs.
- Access walking and bicycling trails in your community and area parks.
- Participate in Walk in the Park activities at South Dakota state parks. For schedule see: http://www.sdgfp.info/Parks/Calendar.htm.
- Participate in Action for Healthy Kids network to improve the health and educational performance of children through better nutrition and physical activity in schools. http://www.actionforhealthykids.org/

Research shows **six science-based strategies** to prevent obesity and other chronic diseases:

- ✓ Increase physical activity
- ✓ Decrease television viewing
- ✓ Increase fruit and vegetable intake
- ✓ Decrease sweetened beverage intake
- ✓ Decrease portion sizes
- ✓ Increase breastfeeding

What Parents Can Do

- Provide children with healthy food choices for meals and snacks.
- Encourage children to be physically active.
- Involve children in selecting and preparing food.
- Learn what your children want from physical activity programs and help choose appropriate activities.
- Volunteer to help children's sports teams and recreation programs.
- Make physical activity a fun, family event.
- Serve as a role model for your children by eating a variety of healthy foods.
- Play and be physically active with children.
- Limit television watching or video games to no more than two hours per day.

Research shows that children must be offered a food ***9-15*** **times** before they will try it. Continue to offer a new food and eventually they are likely to try it.

What Students Can Do

- Make healthy choices in the school cafeteria, when packing lunch, and for snacks.
- Walk to school where possible.
- Set goals for increasing your physical activity and monitor your progress.
- Encourage friends and family members to be physically active and to eat healthfully.
- Use protective clothing and proper equipment to prevent injuries and illnesses.
- Encourage the student council to advocate for physical education classes and after-school programs that are attractive to all students and to request healthy food choices in school and at school events.
- Take elective courses in health, physical education, cooking, and nutrition.
- Limit television watching or computer games to no more than two hours per day.

Turn-off TV Week is a national awareness campaign that encourages Americans to turn off the TV and media for seven days and participate in alternative activities. ***National Turn off the TV Week*** *will* be promoted April 20-26, 2009 through www.healthysd.gov and state partners.

What Teachers & Coaches Can Do

- *Team Nutrition* provides a wealth of information that can be downloaded or ordered without charge. http://doe.sd.gov/oess/cans/nutrition/index.asp
- Use the South Dakota Health Education Content Standards and the South Dakota Physical Education Content Standards as guides for curriculum planning. www.doe.sd.gov/contentstandards/
- Contact Coordinated School Health in the Departments of Education and Health for technical assistance in selecting quality curriculum and increasing physical activity. www.doe.sd.gov/oess/schoolhealth/index.asp
- Promote walking at your school and participate in "SD Schools Walk". www.doe.sd.gov/oess/schoolhealth/sdwalks/index.asp
- Offer healthy, appealing foods wherever food is available and discourage the availability of foods high in fat, sodium, and added sugars (such as soda, candy, and fried chips) at school functions and trips and as part of fund-raising activities.
- Emphasize activity and enjoyment over competition.
- Help students become competent in many motor and behavioral skills.
- Provide nutrition education through activities that are fun, participatory, developmentally appropriate, and culturally relevant. Activities should emphasize the positive, appealing aspects of healthy eating rather than the harmful effects of unhealthy eating.

- Provide opportunities for all children, to participate in quality physical education classes every school day. For information regarding physical activity standards, training events and a tool to analyze the quality of current curriculum, see http://doe.sd.gov/oess/schoolhealth/index.asp.

- Work with food nutrition managers, coaches, physical education teachers, and other staff to coordinate nutrition education efforts and give students consistent messages about healthy eating.

- Model good nutrition and physical activity habits.

- Involve physical activity when teaching in a classroom setting.

- Involve families and community organizations in physical activity programs.

- Refrain from using food to discipline or reward students.

- Request healthy snacks for class parties.

- Include in teaching a discussion of body image and societal pressures, especially for young girls.

South Dakota Schools Walk was developed to get children to walk to school year long. It focuses not only on kids walking to school, but also walking while they are at school, such as walking during recess or before and after the school day. **SD Schools Walk** can take on whatever form you choose that works best for your school and students.

What School Nutrition Staff Can Do

- Provide meals that are tasty and appealing to students and that meet USDA nutrition standards and the Dietary Guidelines for Americans.

- Post the nutritional content of foods served.

- Sell ala carte foods that meet nutrition standards.

- Involve students and families in planning and evaluating school meals.

- Look for continuing education opportunities to learn more about nutrition, preparing healthier meals, food safety, and marketing healthy choices.

- Incorporate marketing and promotion strategies from the Fruit and Vegetables Galore toolkit from *Team Nutrition*.

- Apply for the Healthier U.S. School Challenge from the U.S. Department of Agriculture.

- Support classroom lessons by offering foods to illustrate key messages and decorating the cafeteria with educational posters.

- Provide healthy sack lunches for students for out-of-school events such as athletic trips.

- Invite parents to lunch and give them information about the nutritional value of the meal.

The **Power Panther** visits schools and is part of the U.S. Department of Agriculture's Eat Smart. Play Hard. campaign. If your school would like a visit by this nutrition and physical activity mascot, see: http://doe.sd.gov/oess/cans/nutrition.

What School Administrators & Board Members Can Do

- Organize a school health or nutrition advisory committee that includes all key groups.

- Allocate adequate time for nutrition education as part of a sequential, comprehensive health education program.

Coordinated School Health has developed a monthly communications network for informing all public, private, BIE and tribal school districts about current health issues, available resources, professional development and funding opportunities. Information focuses on Coordinated School Health priority areas including: promoting physical activity and nutrition, HIV prevention and tobacco prevention. To view past issues online, go to: http://doe.sd.gov/oess/schoolhealth/newsinfused/index.asp

- Make schools available to the public to use for walking.

- Require health education and daily physical education for students in grades K-12.

- Encourage food service staff to limit serving sizes to recommended portions.

- Become a *Team Nutrition* school and access information available.

- Provide adequate time and space for students to eat meals in a pleasant, safe environment.

- Provide time during the day, such as recess, for unstructured physical activity, such as walking or jumping rope.

Did you know?

85.5 percent of S.D. High School Students did not attend physical education classes daily as compared to 69.7 percent nationally?

Source: 2007 SD YRBS and 2007 National YRBS

- Stock vending machines with 100 percent fruit juice and other healthy snacks; make sure that healthy foods are served at school meetings and events.

- Limit the sale of high-fat, high-sugar snacks during mealtimes and at fund-raisers.

- Hire qualified physical activity specialists and coaches, food service and nutrition education staff.

- Provide health promotion programs for faculty and staff.

- Evaluate school nutrition and physical activity programs using the School Health Index.

- Use the S.D. Health Education Content Standards and the S.D. Physical Education Content Standards as guides for curriculum planning. www.doe.sd.gov/contentstandards/

- Use *Fit, Healthy, and Ready to Learn* to help write school health policy. http://www.nasbe.org/index.php/bookstore?page=shop.product_details&flypage=flypage-ask.tpl&product_id=24

- Utilize the "Strides to a Healthier Worksite" guide that will take you step by step on how to start a worksite wellness program in your school. http://www.healthysd.gov/Documents/WorksiteToolkit.pdf

What School Nurses & Health Professionals Can Do

- Measure height and weight accurately and use the CDC growth charts to screen children and adolescents.
- Provide anticipatory guidance to parents and children regarding healthy eating and physical activity habits. Evaluate children and adolescents with constructive screens and refer as appropriate for intervention.
- Include in teaching a discussion of body image and societal pressures especially for young girls.
- Utilize "Obesity in South Dakota a Clinical Toolkit for Healthcare Providers" to address weight issues in patients. www.healthysd.gov/HealthProfs/obesitytoolkit.aspx

Did you know?

Only 16% of South Dakota high school students eat the minimum 5 or more servings of fruits and vegetables per day?

Source: 2007 SD Youth Risk Behavior Survey

What Communities Can Do

- Utilize the "Strides to a Healthier Community" planning guide to evaluate your community. www.healthysd.gov/documents/StrideCommunity.pdf
- Provide a mix of competitive team sports and noncompetitive, lifelong fitness and recreation activities.
- Increase the availability of parks, public swimming pools, hiking and biking trails, and other places for physical activity, including sidewalks.
- Ensure that coaches have appropriate coaching competencies.
- Provide after-school programs for children.
- Work with schools, businesses, and community groups to ensure that low-income young people have transportation to and appropriate equipment for physical activity programs.
- Participate in South Dakota Great Day of Play.

South Dakota Great Day of Play is an annual event that encourages people of all ages to get outside and 'play' by being physically active. The first South Dakota Great Day of Play was held in August of 2007 in collaboration with the S.D. Parks and Recreation Association and the state parks, which provided various activities to promote physical activity. Look to www.healthysd.gov for 2009 events and opportunities for hosting activities.

Technical Notes

Height Short stature is defined as a height-for-age below the 5th percentile for children of the same height and age in the reference populations used by the CDC.

Children grow at different rates depending upon age and gender. The BMI value is plotted on growth charts, and the resulting value of BMI-for-age is presented as a percentile value.

Underweight Children falling below the 5th percentile in BMI-for-age, compared to children of the same gender and age in the CDC reference population, are considered underweight.

Overweight If a child's BMI-for-age is between the 85th and 94th percentile in the CDC reference population of children matched for age and gender, the child is considered to be overweight.

Obese If a child is at or above the 95th percentile for children of that age and gender, the child is considered to be obese.

Obesity Obesity is an excessively high amount of body fat or adipose tissue in relation to lean body mass. Adults with a BMI of 25 to 29.9 are considered overweight, while adults with a BMI of 30 or more are considered obese**.**

Confidence Intervals (CI) The standard error (SE) of a rate is used in health statistics when studying or comparing rates. The SE defines a rate's variability and can be used to calculate a confidence interval (CI) to determine the actual variance of a rate 95 percent of the time. Rates for two different populations (areas, regions) are considered to be significantly different when their confidence intervals do not overlap.

The standard error and confidence intervals are calculated in the following manner. For example, Region 5's high obese rate is 21.2 percent. This was based on 1313 student measurements of which 278 are "obese" in 2007-2008. The square root of 278 is roughly 16.7. By dividing the rate of 21.2 by 16.7, the estimated SE of approximately 1.27 is the result. The estimated SE can then be used to compute a 95 percent CI for the rate. The standard formula **RATE ± (1.96 *SE)** is used for determining the 95 percent CI. Following this formula, we produce an equation of 21.2 ± (1.96 * 1.27) and the result is 21.2 ± 2.5. From this the estimated 95 percent CI is 18.7 to 23.7 percent. It could then be stated, with 95 percent certainty that the actual 2007-2008 obese rate for Region 5 is between 18.7 and 23.7 percent.

Therefore, Region 5's obese rate would be considered significantly different from the state rate. This is because the confidence intervals for Region 5 (18.7-23.7) and the state (15.9-16.7) do not overlap. The same can be said for Region 3 (17.1-19.5) and Region 4 (16.8-19.5). Region 2 is significantly below the state CI levels. Regions 1, 6, and 7 are not considered significantly different as the confidence intervals overlap the statewide intervals. See Figure 8 page 11.

BMI (Body Mass Index) The formula to calculate BMI is weight (lb) ÷ height (in) ÷ height (in) x 703. This formula is used for adults. See the next page for children and adolescents BMI.

BMI - Body Mass Index: BMI for Children and Adolescents BMI is used differently with children and adolescents than it is with adults. In children and adolescents, body mass index for age is used to assess underweight, overweight, and obesity. Girls and boys differ in their body fatness as they mature. This is why BMI for children, also referred to as BMI-for-age, is gender and age specific.[1, 2] BMI-for-age is plotted on gender specific growth charts. These charts are used for children and adolescents 2 – 20 years of age. For the 2000 CDC Growth Charts and additional information visit CDC's National Center for Health Statistics website at http://www.cdc.gov/growthcharts/.

Each of the CDC BMI-for-age gender specific charts contains a series of curved lines indicating specific percentiles. So if a child is in the 60th percentile it means that compared to children of the same gender and age, 60 percent have a lower BMI. Healthcare professionals use the following established percentile cutoff points to screen underweight and overweight in children.

Underweight	BMI-for-age < 5th percentile
Overweight	BMI-for-age 85th percentile to < 95th percentile
Obese	BMI-for-age ≥ 95th percentile

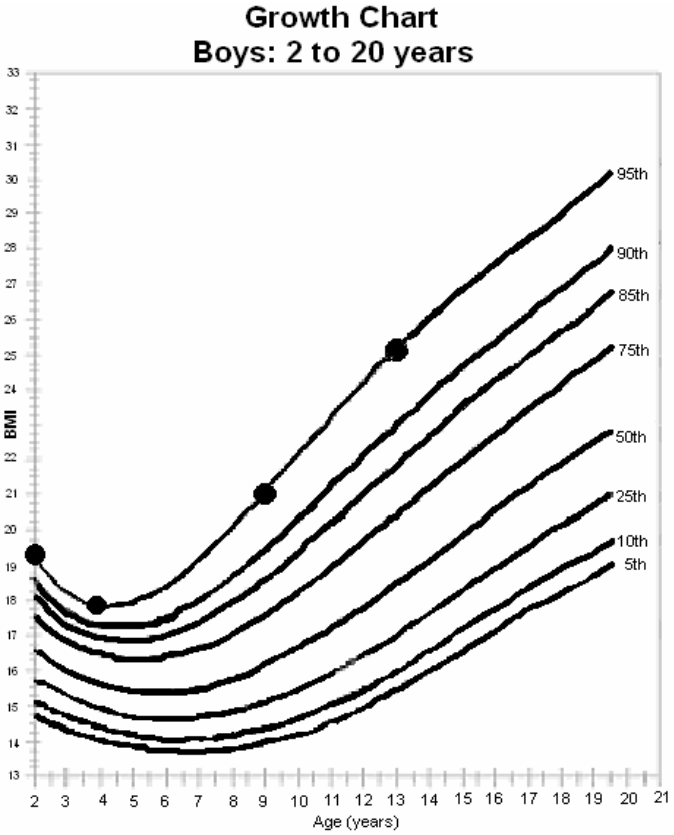
BMI decreases during the preschool years, then increases into adulthood. The percentile curves show this pattern of growth.

Sample of BMI and Growth Chart

As a boy grows, his BMI changes, but he remains at the 95th percentile BMI-for-age.

Age	BMI	Percentile
2	19.3	95th
4	17.8	95th
9	21.0	95th
13	25.1	95th

The example shows how the boy's BMI declines during his preschool years and increases, as he gets older.



BMI-for-Age for children and adolescents is a useful tool because:

- BMI-for-age provides a reference for adolescents that can be used beyond puberty.
- BMI-for-age in children and adolescents compares well to laboratory measures of body fat.
- BMI-for-age can be used to track body size throughout life

[1] Hammer LD, Kraemer HC, Wilson DM, Ritter PL, Dornbusch SM. Standardized percentile curves of body-mass index for children and adolescents. *American Journal of Disease of Child*. 1991; 145:259–263.

[2] Pietrobelli A, Faith MS, Allison DB, Gallagher D, Chiumello G, Heymsfield, SB. Body mass index as a measure of adiposity among children and adolescents: A validation study. *Journal of Pediatrics*. 1998; 132:204–210.

Acknowledgements

A special thanks goes to the school personnel who submitted the data and to the Centers for Disease Control and Prevention for technical assistance. This is an ongoing project and schools are encouraged to continue to submit data they are collecting.

Other South Dakota State Agency Websites:

Healthy South Dakota: www.healthysd.gov

Healthy SD Coordinated School Health in the Departments of Education and Health: http://doe.sd.gov/oess/schoolhealth/index.asp

CANS/Team Nutrition SD Model School Wellness Policy and Resources: http://doe.sd.gov/oess/cans/docs/Wellness_Policy.pdf

For More Information

For additional ideas about how to address overweight and obesity, try these websites:

Centers for Disease Control and Prevention (CDC), National Center for Chronic Disease Prevention and Health Promotion, Division of Adolescent and School Health**:** www.cdc.gov/healthyyouth/index.htm

Centers for Disease Control and Prevention (CDC), National Center for Chronic Disease Prevention and Health Promotion, Division of Nutrition and Physical Activity**:** www.cdc.gov/nccdphp/dnpa

School Health Index for Physical Activity and Healthy Eating: A Self-Assessment and Planning Guide: http://doe.sd.gov/oess/schoolhealth/resources.asp

Action for Healthy Kids, nationwide initiative with guidance provided by more than 30 national organizations and government agencies: www.actionforhealthykids.org

Promoting Physical Activity A Guide to Community Action: www.cdc.gov /nccdphp/dnpa/pahand.htm

Team Nutrition—Healthy School Meals Resource System: http://schoolmeals.nal.usda.gov/

South Dakota Department of Education: www.doe.sd.gov/oess/schoolhealth /index.asp

South Dakota Game, Fish and Parks has brochures and resources for outdoor physical education opportunities. www.sdgfp.info/

References

1. American Journal of Clinical Nutrition 1991;54:773.

2. *Barlow SE and the Expert Committee, Expert Committee Recommendations Regarding the Prevention, Assessment, and Treatment of Child and Adolescent Overweight and Obesity: Summary Report, Journal of Pediatrics* supplement, 2007; 120; S164-S192

3. BMI – Body Mass Index: BMI for Children and Adolescents. BMI is used differently with children that it is with adults. www.cdc.gov/nccdphp/dnpa/bmi/bmi-for-age.htm

4. Centers for Disease Control and Prevention. Guidelines for School and Community Programs to Promote Lifelong Physical Activity Among Young People, *MMWR* v 46 no RR-6, March 7, 1997.

5. Centers for Disease Control and Prevention. Guidelines for School Health Programs to Promote Lifelong Healthy Eating Among Young People, *MMWR* Recommendation and Reports June 14, 1996/45 (RR-9); 1-33

6. Centers for Disease Control and Prevention. Press Release, More American Children and Adolescents are Overweight, March 12, 2002.

7. Davis MM, Gance-Cleveland B, Hassink S, Johnson R, Paradis G, and Resnicow K. Recommendations for Prevention of Childhood Obesity, *Journal of Pediatrics* supplement, 2007; 120; S229-S253.

8. Department of Agriculture, Food & Nutrition Service, Changing the Scene, Improving the School Nutrition Environment, September 2001. www.fns.usda.gov/tn.

9. Department of Health & Human Services, Centers for Disease Control, School Health Index. February 2001.

10. Dietz WH, Health Consequences of Obesity in Youth: Childhood Predictors of Adult Disease, *Pediatrics*, vol 101, no 3, March 1998 suppl.

11. Hammer LD, Kraemer HC, Wilson DM, Ritter PL, Dornbusch SM. Standardized percentile curves of body-mass index for children and adolescents. *American Journal of Disease of Child.* 1991; 145:259-263

12. Krebs NF, Himes, JH, Jacobson D, Nicklas TA, Guilday P, and Styne D. *Assessment of Child and Adolescent Overweight and Obesity, Journal of Pediatrics* supplement, 2007; 120; S193-S228

13. Mei, Z, Scanlon KS, Grummer-Strawn LM, Freedman DS, Yip R, Trowbridge FL, Increasing Prevalence of Overweight Among US Low-Income Preschool Children: The Centers for Disease Control and Prevention Pediatric Nutrition Surveillance, 1983 to 1995, *Pediatrics* vol 101, no 1, January 1998.

14. Mokdad AH, Serdula MK, Dietz WH, Bowman BA, Marks JS, Koplan JP, The Spread of the Obesity Epidemic in the United States, 1991-1998, *JAMA* vol 282, no 16, October 27, 1999.

15. National Association of State Boards of Education, Fit Healthy, and Ready to Learn, March 2001. www.nasbe.org/HealthySchools/fithealthy.html

16. Nutrition and Physical Activity Field Assessment of Children in Rural America, Jessica Noel Walker, Joy Miller Del Rosso, and Alison Karyl Held, March 2005 www.savethechildren.org/usa/images/Final_Field_Assessment_2005.pdf

17. Pietrobelli A, Faith MS, Allison DB, Gallagher D, Chiumello G, Heymsfield, SB. Body mass index as a measure of adiposity among children and adolescents: A validation study. *Journal of Pediatrics*. 1998; 132:204–210.

18. Promoting Better Health for Young People Through Physical Activity and Sports, A Report to the President from the Secretary of Health and Human Services and the Secretary of Education, Fall 2001.

19. Promoting Lifelong Healthy Eating Among Young People, How You Can Help, CDC, June 1997.

20. Promoting Lifelong Physical Activity Among Young People, How You Can Help, CDC, March 1997.

21. South Dakota Department of Education and South Dakota Department of Human Services, South Dakota Youth Risk Behavior Survey Report http://doe.sd.gov/oess/schoolhealth/yrbs/docs/2005YRBSReport.pdf

22. South Dakota Department of Health, Pediatric Nutrition Surveillance System (PedNSS) Summary of 2003 Data, November 2004.

23. Story M, Holt K, and Sofka D, Bright Futures in Practice: Nutrition, 2001.

24. Troiano RP and Flegal KM, Overweight Children and Adolescents: Description, Epidemiology, and Demographics, *Pediatrics*, vol 101, no 3, March 1998 suppl.

Appendix 1:
Directions for Completing School Heights and Weights Data Sheet

1. **School Name and County:** Provide full name of school and county in which school is located.
Provide Grade Level of School: High School, Jr. High, or Middle School, Elementary School, etc.
District Name: Report the name of the school district in which the school is located.
Mailing Address of School, Town, Zip Code: This information is needed for mailing reports and information to the school. Provide the complete mailing address.
Contact Name and Telephone Number: This information is needed incase there are questions about the data. Provide the name of the contact person and their telephone number.
Building Principal's Name, Mailing Address, and Telephone Number: This information is needed for contact purposes.

2. **Date of Measurement:** Complete date using month, day, and year. If data was obtained on September 20, 2007 enter 09 20 2007. Use a ***separate page for each day*** data is collected. Please send data as obtained rather than wait until the end of the school year to send the recorded data.

Information on each student measured:

3. **Name of student:** This information **should be removed** before submitting the data. It is provided for local school information only.

4. **ID#:** Each child measured needs a unique identification number. It can just be numerical order but three digits should be used (i.e., 001, 002, etc). The number is to be used for data collection purposes only. **Please do not use an ID number more than once.**

5. **Sex:** Enter sex of student as either 1 (male) or 2 (female).

6. **Date of Birth:** Record person's date of birth. If date of birth is May 8, 1998, record as follows:

Mo.		Day		Year			
0	5	0	8	1	9	9	8

7. **Ethnic Origin/Race:** Enter ethnic origin. This is to be completed by observation of race. Select one of the categories listed below. Enter number as follows:

1 White, not Hispanic
2 Black, not Hispanic
3 Hispanic
4 American Indian or Alaskan Native
5 Hawaiian or Pacific Islander
6 Asian
7 Other
9 Not Specified / Unknown

8. **Height:** Enter height of individual. Use inches to the nearest 1/8 inch. Do not change denominator of fraction. Always convert to eighths: 3/4 should be converted to 6/8, 1/4 to 2/8, etc. If height is 45 1/8 inches, record as follows:

4	5	1/8

Allowable entries for numerator of fraction are 0-7. **Do not leave blank if zero**. Do not use 9 for unknown fraction unless inches are unknown also. If height is 62 inches, record as follows:

6	2	0/8

Below is a conversion chart to convert feet and inches to inches. This has been added to the report form for ease of reporting height in inches, as required.

Ft.	In.	= Inches	Ft.	In.	= Inches	Ft.	In.	= Inches	Ft.	In.	= Inches
3	0	= 36	4	0	= 48	5	0	= 60	6	0	= 72
3	1	= 37	4	1	= 49	5	1	= 61	6	1	= 73
3	2	= 38	4	2	= 50	5	2	= 62	6	2	= 74
3	3	= 39	4	3	= 51	5	3	= 63	6	3	= 75
3	4	= 40	4	4	= 52	5	4	= 64	6	4	= 76
3	5	= 41	4	5	= 53	5	5	= 65	6	5	= 77
3	6	= 42	4	6	= 54	5	6	= 66	6	6	= 78
3	7	= 43	4	7	= 55	5	7	= 67	6	7	= 79
3	8	= 44	4	8	= 56	5	8	= 68	6	8	= 80
3	9	= 45	4	9	= 57	5	9	= 69	6	9	= 81
3	10	= 46	4	10	= 58	5	10	= 70	6	10	= 82
3	11	= 47	4	11	= 59	5	11	= 71	6	11	= 83

Height should be measured with metal measuring tape and right-angle headpiece or full-length measuring board to insure accuracy. Do not use the measuring rod on the adult balance beam weight scale because it is not accurate. Have individual remove shoes, heavy outer clothing, hats, and hair barrettes. Procedure:

(1) Have the individual stand with his/her back against the wall on a flat floor directly in front of the measuring tape. The tape should run directly down the center of his/her back.
(2) Individual should stand with feet slightly apart and the back as straight as possible. The heels, buttocks, and shoulder blades should touch the wall or surface of the measuring board.
(3) Have individual look straight ahead with head erect but not touching the wall or measuring board.
(4) Place the headpiece flat against the wall and at a right angle to the head. Lower it until it firmly touches the crown of the head.
(5) Hold the right-angle headpiece steady and have the person move out from under it.
(6) Read the measurement at eye level where the lower edge of the headpiece intersects the measuring tape.
(7) Repeat the procedure until two measurements agree within 1/4 inch. Record the larger of the two measurements on the form.

9. **Weight:** Enter weight of individual. Use pounds to the nearest 1/4 pound. Do not change the denominator of the fraction. Always convert to fourths (1/2 should be converted to 2/4, 4/16 to 1/4, etc.) For example, if weight is 56 1/2 pounds, record as follows:

0	5	6	2/4

Do not leave numerator of fraction blank if zero. Do not use 9 for unknown fraction unless pounds are unknown also. For example, 125 pounds should be recorded as follows:

1	2	5	0/4

Weight should be taken without shoes or heavy outer clothing. Use adult beam balance scale if at all possible. Scale needs to be placed on uncarpeted floor if possible for an accurate weight. Child needs to stand on the center of scale platform and not be touching other objects or person. Child should be weighed, step off the scale, and then weighed again to insure an accurate weight.

10. **Submit data as soon as possible after measurements are taken,** though data will be accepted throughout the school year, the summary of data will be reported by calendar year. Send all data to:

Email: Carrie.Cushing@state.sd.us

Mail: Carrie Cushing
South Dakota Department of Health
600 E. Capitol
Pierre, SD 57501-2535 Fax:605/773-5683

Return to: **Carrie Cushing email: Carrie.Cushing@state.sd.us**
South Dakota Department of Health
600 East Capitol
Pierre, SD 57501-25355

SCHOOL HEIGHTS/WEIGHTS

School Name: _____

County: _____ Grade Levels of School: _____
District Name: _____ Mailing Address of School: _____
City: _____ Zip Code: _____
Contact Person: _____ Contact's Email Address: _____
Contact's Address (if different/Sch): _____
Contact's Telephone: _____ Contact's Zip Code: _____
Contact's City: _____ Principal's Telephone: _____
Building Principal's Name: _____ Principal's City: _____
Principal's Address (if different/Sch): _____ Principal's Email Address: _____
Principal's Zip Code: _____

Date of Measurements: _____ MO. DAY YEAR

Name (**For your use only – remove before submitting**)	ID#	Sex **(required)**	DOB **(required)** mo	day	year	Race	Height **inches**	**8's**	Weight **pounds**	**4's**
								/8		/4
								/8		/4
								/8		/4
								/8		/4
								/8		/4
								/8		/4
								/8		/4
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								/8		/4
								/8		/4
								/8		/4
								/8		/4
								/8		/4
								/8		/4
								/8		/4

Converting Feet & Inches to Inches

Ft.	In.	= Inches
3	0	= 36
3	1	= 37
3	2	= 38
3	3	= 39
3	4	= 40
3	5	= 41
3	6	= 42
3	7	= 43
3	8	= 44
3	9	= 45
3	10	= 46
3	11	= 47
4	0	= 48
4	1	= 49
4	2	= 50
4	3	= 51
4	4	= 52
4	5	= 53
4	6	= 54
4	7	= 55
4	8	= 56
4	9	= 57
4	10	= 58
4	11	= 59
5	0	= 60
5	1	= 61
5	2	= 62

Ft.	In.	= Inches
5	3	= 63
5	4	= 64
5	5	= 65
5	6	= 66
5	7	= 67
5	8	= 68
5	9	= 69
5	10	= 70
5	11	= 71
6	0	= 72
6	1	= 73
6	2	= 74
6	3	= 75
6	4	= 76
6	5	= 77
6	6	= 78
6	7	= 79
6	8	= 80
6	9	= 81
6	10	= 82
6	11	= 83
7	0	= 84
7	1	= 85
7	2	= 86
7	3	= 87
7	4	= 88
7	5	= 89

RACE: 1=White, Not Hispanic 2=Black, Not Hispanic 3=Hispanic 4=American Indian or Alaskan Native 5= Hawaiian or Pacific Islander
6= Asian 7=Other 9=Not specified **SEX:** 1 for Male 2 for Female

Appendix 2
Participating Schools

School Name	Education Service Agency Region	County
Alcester Elementary, Alcester	2	Union
Alkali Elementary, Sturgis	7	Meade
All City Elementary, Sioux Falls	2	Minnehaha
Anne Sullivan Elementary, Sioux Falls	2	Minnehaha
Armour Elementary, Armour	3	Douglas
Artesian-Letcher Schools, Artesian	3	Sanborn
Atall Elementary, Sturgis	7	Meade
Axtell Park Middle School, Sioux Falls	2	Minnehaha
Baltic Elementary, Baltic	1	Minnehaha
Batesland Elementary, Batesland	7	Shannon
Belle Fourche High School, Belle Fourche	7	Butte
Belle Fourche Middle School, Belle Fourche	7	Butte
Bethesda Lutheran Elementary, Hot Springs	7	Fall River
Black Hawk Elementary, Black Hawk	7	Meade
Blumengard Colony, Cresbard	4	Faulk
Bonesteel-Fairfax Schools, Bonesteel	3	Gregory
Brandon Elementary, Brandon	2	Minnehaha
Brandon Valley Middle School, Brandon	2	Minnehaha
Brentwood Colony, Cresbard	4	Faulk
Bridges, Sioux Falls	2	Minnehaha
Bridgewater Elementary, Bridgewater	2	McCook
Brookings High School, Brookings	1	Brookings
Brown High School, Sturgis	7	Meade
Buchanan Elementary, Huron	4	Beadle
Buchanan Elementary, Pierre	6	Hughes
Burke Elementary, Burke	3	Gregory
Burke High School, Burke	3	Gregory
Canistota Elementary, Canistota	2	McCook
Canton Middle School, Canton	2	Lincoln
Canyon Lake Elementary, Rapid City	7	Pennington
Castlewood Elementary, Castlewood	1	Hamlin
Castlewood High School, Castlewood	1	Hamlin
Castlewood Junior High, Castlewood	1	Hamlin
CC Lee Elementary, Aberdeen	4	Brown
Central Elementary, Brookings	1	Brookings
Central High School, Aberdeen	4	Brown
Challenge Center, Sioux Falls	2	Minnehaha
Chancellor Elementary, Chancellor	2	Lincoln
Chester Area Schools, Chester	1	Lake
Cheyenne R. BIA Elementary, Eagle Butte	5	Dewey
Christ The King Elementary, Sioux Falls	2	Minnehaha
Cleveland Elementary, Sioux Falls	2	Minnehaha
Colman-Egan Schools, Colman	1	Moody
Dakota Middle School, Rapid City	7	Pennington
Dakota Valley Elementary, North Sioux City	2	Union
De Smet High School, De Smet	1	Kingsbury

Participating Schools (continued)

School Name	Education Service Agency Region	County
De Smet Middle School, De Smet	1	Kingsbury
Discovery Elementary, Sioux Falls	2	Minnehaha
Douglas Middle School, Box Elder	7	Pennington
East Elementary, Spearfish	7	Lawrence
Edison Middle School, Sioux Falls	2	Minnehaha
Elm Springs Elementary, Elm Springs	7	Meade
Emery Elementary, Emery	2	Hanson
Enning Elementary, Enning	7	Meade
Ethan Elementary, Ethan	3	Davison
Ethan Middle School, Ethan	3	Davison
Eugene Field Elementary, Sioux Falls	2	Minnehaha
Eureka Elementary, Eureka	5	McPherson
Eureka High School, Eureka	5	McPherson
Eureka Junior High School, Eureka	5	McPherson
Evergreen Colony, Cresbard	4	Faulk
Faith Elementary, Faith	5	Meade
Family Immersion Center, Sioux Falls	2	Minnehaha
Flandreau Elementary, Flandreau	1	Moody
Florence Elementary, Florence	1	Codington
Frederick Elementary, Frederick	4	Brown
Freeman Academy Elementary, Freeman	2	Hutchinson
Freeman Academy High School, Freeman	2	Hutchinson
Freeman Davis Elementary, Mobridge	5	Walworth
Freeman Schools, Freeman	2	Hutchinson
Garfield Elementary, Sioux Falls	2	Minnehaha
Gayville-Volin Elementary, Gayville	2	Yankton
Gayville-Volin High School, Gayville	2	Yankton
Gayville-Volin Middle School, Gayville	2	Yankton
General Beadle Elementary, Mobridge	5	Walworth
General Beadle Elementary, Rapid City	7	Pennington
George S. Mickelson Middle School, Brookings	1	Brookings
Gertie Belle Rogers Elementary, Mitchell	3	Davison
Glendale Colony Elementary, Tulare	4	Spink
Gracevale Colony Elementary, Madison	1	Lake
Gregory Schools, Gregory	3	Gregory
Groton Elementary, Groton	4	Brown
Groton High School, Groton	4	Brown
Groton Junior High School, Groton	4	Brown
Harrisburg Explorer Elementary, Sioux Falls	2	Lincoln
Harrisburg Liberty Elementary, Harrisburg	2	Lincoln
Harvey Dunn Elementary, Sioux Falls	2	Minnehaha
Hawthorne Elementary, Sioux Falls	2	Minnehaha
Hayward Elementary, Sioux Falls	2	Minnehaha
Hillcrest Elementary, Brookings	1	Brookings
Hitchcock-Tulare Schools, Tulare	4	Spink
Holgate Junior High School, Aberdeen	4	Brown
Holy Cross Elementary, Ipswich	4	Edmunds
Horace Mann Elementary, Rapid City	7	Pennington
Horace Mann Elementary, Sioux Falls	2	Minnehaha
Hot Springs Elementary, Hot Springs	7	Fall River

Participating Schools (continued)

School Name	Education Service Agency Region	County
Hoven Elementary, Hoven	5	Potter
Hoven High School, Hoven	5	Potter
Hoven Junior High School, Hoven	5	Potter
Howard Elementary, Howard	1	Miner
Howard High School, Howard	1	Miner
Howard Junior High School, Howard	1	Miner
Huron High School, Huron	4	Beadle
Huron Middle School, Huron	4	Beadle
Immaculate Conception, Watertown	1	Codington
Irene-Wakonda Schools, Irene	2	Clay
Iroquois Schools, Iroquois	4	Kingsbury
Isna Wica Owayawa Elementary, Oglala	7	Shannon
Jamesville Colony Elementary, Utica	3	Yankton
Juvenile Detention Center, Sioux Falls	2	Minnehaha
Jefferson Elementary, Huron	4	Beadle
Jefferson Elementary, Pierre	6	Hughes
Jefferson Elementary, Sioux Falls	2	Minnehaha
Joe Foss Alternative, Sioux Falls	2	Minnehaha
John F Kennedy Elementary, Sioux Falls	2	Minnehaha
John Harris Elementary, Sioux Falls	2	Minnehaha
John Paul II Elementary, Mitchell	3	Davison
Jones County Elementary, Murdo	6	Jones
Jones County High School, Murdo	6	Jones
Jones County Junior High, Murdo	6	Jones
Kimball Schools, Kimball	3	Brule
Knollwood Heights Elementary, Rapid City	7	Pennington
Koch Elementary, Milbank	1	Grant
Lake Preston Elementary, Lake Preston	1	Kingsbury
Laura B. Anderson Elementary, Sioux Falls	2	Minnehaha
Laura Ingalls Wilder, De Smet	1	Kingsbury
Laura Wilder Elementary, Sioux Falls	2	Minnehaha
LB Williams Elementary, Mitchell	3	Davison
Lead-Deadwood Elementary, Lead	7	Lawrence
Lennox Elementary, Lennox	2	Lincoln
Lennox Middle School, Lennox	2	Lincoln
Lincoln Elementary, Aberdeen	4	Brown
Lincoln Elementary, Watertown	1	Codington
Lincoln Elementary, Yankton	3	Yankton
Lincoln High School, Sioux Falls	2	Minnehaha
Longfellow Elementary, Mitchell	3	Davison
Longfellow Elementary, Sioux Falls	2	Minnehaha
Lowell Elementary, Sioux Falls	2	Minnehaha
Lower Brule Elementary, Lower Brule	6	Lyman
Madison Central Elementary, Madison	1	Lake
Madison Elementary, Huron	4	Beadle
Marion Elementary, Marion	2	Turner
Mark Twain Elementary, Sioux Falls	2	Minnehaha
Marty Elementary, Marty	3	Charles Mix
Marty High School, Marty	3	Charles Mix
Marty Indian School Alternative, Marty	3	Charles Mix

Participating Schools (continued)

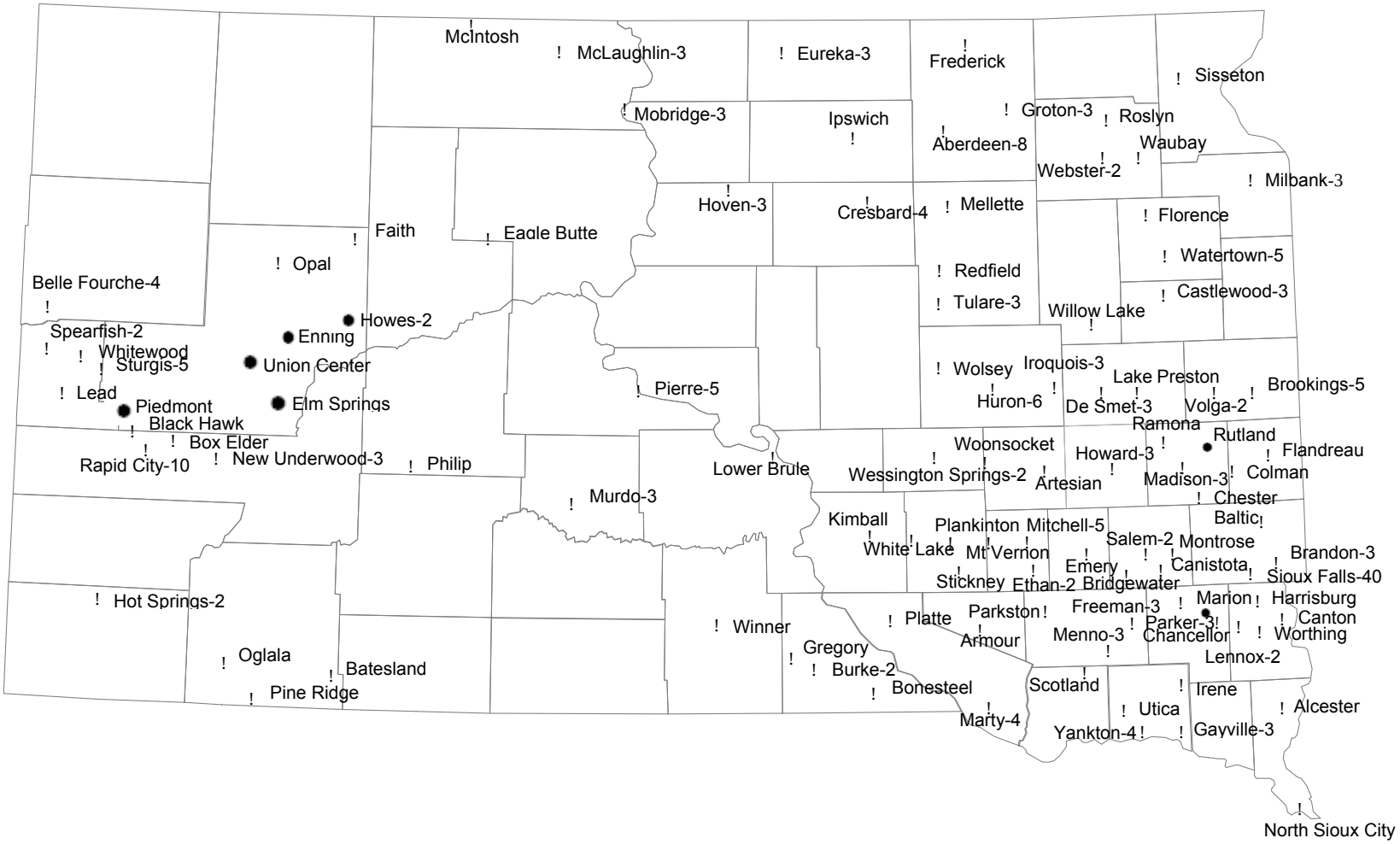
School Name	Education Service Agency Region	County
Marty Middle School, Marty	3	Charles Mix
Maxwell Colony Elementary, Scotland	3	Hutchinson
May Overby Elementary, Aberdeen	4	Brown
McCook Central Middle School, Salem	2	McCook
McIntosh Schools, McIntosh	5	Corson
McKinley Elementary, Pierre	6	Hughes
McKinley Elementary, Watertown	1	Codington
McLaughlin Elementary, McLaughlin	5	Corson
McLaughlin High School, McLaughlin	5	Corson
McLaughlin Junior High School, McLaughlin	5	Corson
Medary Elementary, Brookings	1	Brookings
Memorial Middle School, Sioux Falls	2	Minnehaha
Menno Elementary, Menno	3	Hutchinson
Menno High School, Menno	3	Hutchinson
Menno Junior High School, Menno	3	Hutchinson
Milbank High School, Milbank	1	Grant
Milbank Middle School, Milbank	1	Grant
Mitchell Middle School, Mitchell	3	Davison
Montrose Elementary, Montrose	2	McCook
Mount Vernon Elementary, Mount Vernon	3	Davison
New Underwood Elementary, New Underwood	7	Pennington
New Underwood High School, New Underwood	7	Pennington
New Underwood Jr. H.S., New Underwood	7	Pennington
North Middle School, Rapid City	7	Pennington
North Park Elementary, Belle Fourche	7	Butte
Northwestern Elementary, Mellette	4	Spink
Oldham-Ramona Schools, Ramona	1	Lake
OM Tiffany Elementary, Aberdeen	4	Brown
Opal Elementary, Opal	7	Meade
Oscar Howe Elementary, Sioux Falls	2	Minnehaha
Parker Elementary, Parker	2	Turner
Parker High School, Parker	2	Turner
Parker Junior High School, Parker	2	Turner
Parkston Elementary, Parkston	2	Hutchinson
Patrick Henry Middle School, Sioux Falls	2	Minnehaha
Pearl Creek Colony Elementary, Iroquois	4	Kingsbury
Philip Schools, Philip	7	Haakon
Piedmont/Stagebarn Elementary, Piedmont	7	Meade
Pierre Indian Learning Center, Pierre	6	Hughes
Plankinton Elementary, Plankinton	3	Aurora
Platte Elementary, Platte	3	Charles Mix
Rapid Valley Elementary, Rapid City	7	Pennington
Redfield Elementary, Redfield	4	Spink
Robbinsdale Elementary, Rapid City	7	Pennington
Robert Bennis Elementary, Brandon	2	Minnehaha
Roosevelt High School, Sioux Falls	2	Minnehaha
Rosa Parks Elementary, Sioux Falls	2	Minnehaha
Roslyn Schools, Roslyn	1	Day
Rutland Elementary, Rutland	1	Lake
Sacred Heart, Yankton	3	Yankton

Participating Schools (continued)

School Name	Education Service Agency Region	County
School For The Deaf Combined, Sioux Falls	2	Minnehaha
SDHSC Alternative School, Yankton	3	Yankton
Simmons Elementary, Aberdeen	4	Brown
Simmons Middle School, Aberdeen	4	Brown
Sioux Valley Elementary, Volga	1	Brookings
Sioux Valley Junior High, Volga	1	Brookings
South Park Elementary, Belle Fourche	7	Butte
South Park Elementary, Rapid City	7	Pennington
Spink Colony Elementary, Tulare	4	Spink
St Lambert Elementary, Sioux Falls	2	Minnehaha
St Mary's Elementary, Salem	2	McCook
St. Mary's Holy Spirit, Sioux Falls	2	Minnehaha
St Thomas Elementary, Madison	1	Lake
Stickney Elementary, Stickney	3	Aurora
Sturgis Elementary, Sturgis	7	Meade
Success, Sioux Falls	2	Minnehaha
Sunny Plains Christian School, Iroquois	4	Kingsbury
Takini Elementary, Howes	7	Meade
Takini High School, Howes	7	Meade
Terry Redlin, Sioux Falls	2	Minnehaha
Thunderbird Colony, Cresbard	4	Faulk
Union Center Elementary, Union Center	7	Meade
Valley View Elementary, Rapid City	7	Pennington
Washington Elementary, Huron	4	Beadle
Washington Elementary, Pierre	6	Hughes
Washington High School, Sioux Falls	2	Minnehaha
Watertown High School, Watertown	1	Codington
Watertown Middle School, Watertown	1	Codington
Waubay Schools, Waubay	1	Day
Webster Elementary, Webster	1	Day
Webster Middle School, Webster	1	Day
Wessington Springs Elem., Wessington Springs	3	Jerauld
Wessington Springs M.S., Wessington Springs	3	Jerauld
West Elementary, Spearfish	7	Lawrence
Westside Elementary, Sisseton	1	Roberts
White Lake Elementary, White Lake	3	Aurora
Whitewood Elementary, Whitewood	7	Meade
Whittier Middle School, Sioux Falls	2	Minnehaha
Williams Middle School, Sturgis	7	Meade
Willow Lake Schools, Willow Lake	1	Clark
Winner Elementary, Winner	6	Tripp
Wolf Creek Elementary, Pine Ridge	7	Shannon
Wolsey/Wessington Schools, Wolsey	4	Beadle
Woonsocket Elementary, Woonsocket	3	Sanborn
Worthing Elementary, Worthing	2	Lincoln
Yankton Christian School, Yankton	3	Yankton

Appendix 3

Schools Participating In Height & Weight Survey



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